SCIENTIFIC NOTE

Occurrence of *Ips apache* Lanier (Coleoptera: Curculionidae: Scolytinae) in Panama

*Ips* DeGeer species are ubiquitous herbivores of pine (*Pinus* L. spp.) and spruce (*Picea* Dietrich spp.) in North America and occur throughout the range of their hosts from Alaska to northern Nicaragua (Wood and Bright 1992). Although usually a secondary pest of natural and managed stands of pine and spruce, *Ips* outbreaks can cause extensive destruction to forest resources (*e.g.*, *Ips confusus* [LeConte] and *Ips typographus* [L.]) (Wermelinger 2004; Breshears *et al.* 2005). Hence, there is a global concern with regard to *Ips* infestations where pines are planted. Pine has been extensively grown outside of its range in tropical and Southern Hemisphere countries such as Australia, New Zealand, South Africa, Costa Rica, Panama, Uruguay, and Chile (Wingfield *et al.* 2001).

During a trip to Panama by SMS in August 2008, *Ips apache* Lanier, 1991 was discovered breeding in fallen *Pinus* trees and slash. Specimens were collected in Chiriquí Province: Bajo Mono (8°48.703′N, 82°27.383′W), Fortuna (8°44.043′N, 82°14.251′W), and Santa Clara (8°51.695′N, 82°44.590′W) and in Panama Province: Cerro Jefe (9°13.339′N, 79°22.257′W); thrice from *Pinus caribaea* Morelet and once from unidentified species of four- and five-needle pines. Between 11 and 76 specimens were collected at each site and voucher specimens were deposited at the Smithsonian Tropical Research Institute (STRI), Museo de Invertebrados G. B. Fairchild at the Universidad de Panamá, and the A. J. Cook Arthropod Research Collection at Michigan State University.

Due to the very similar morphology of *I. apache* and *Ips calligraphus* (Germar) (Lanier *et al.* 1991), identity was confirmed by sequencing 408 bp of mitochondrial cytochrome-oxidase I gene from three individuals from all sites, except Santa Clara. A cladogram was reconstructed using these sequences and a dataset including all *Ips* species (Cognato and Sun 2007) following the authors’ protocols. The resulting cladogram was nearly identical to Figure 2 in Cognato and Sun (2007). Panamanian *I. apache* individuals were monophyletic with *I. apache* individuals from Honduras and Belize and sister to *I. apache* individuals from Arizona and Mexico (Fig. 1). The mtDNA haplotype was the same for Panamanian and Honduran individuals and differed by 0.07% compared to the Belizean individual. The DNA of the Central American and North American individuals differed by 2.5–3.0%. It is

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![Figure 1](image-url)

**Fig. 1.** Relationships of *Ips apache* and *Ips calligraphus* inferred from 408 nucleotides of COI mtDNA and reconstructed via parsimony. Numbers indicate bootstrap values.